Plant Assessment Form

For use with the "Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands" by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association (Warner et al. 2003)

Printable version, February 28, 2003
(Modified for use in Arizona, 07/02/04)

Table 1. Species and Evaluator Information

Species name (Latin binomial)**:**	*Vinca major* L. (USDA 2005)
Synonyms:	*Vinca major* L. var. *variegata* Loud. (USDA 2005)
Common names:	Bigleaf periwinkle, periwinkle, large periwinkle, blue periwinkle, greater periwinkle
Evaluation date (mm/dd/yy)**:**	04/22/05
Evaluator #1 Name/Title:	Elizabeth Makings/ Botanist -Terrestrial Ecosystems Survey, Tonto National Forest; Collections Manager – Arizona State University Herbarium
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Committee review date:	04/22/05
List date:	04/22/05
Re-evaluation date(s):	

Table 2. Scores, Designations, and Documentation Levels

Question		Score	Documentation Level	Section Scores	Overall Score & Designations
1.1	Impact on abiotic ecosystem processes	**B**	Other published material	**"Impact"** **Section 1 Score:** **B**	**"Plant Score"** **Overall Score:** **Medium** **Alert Status:** **Alert**
1.2	Impact on plant community	**B**	Other published material		
1.3	Impact on higher trophic levels	**U**	Other published material		
1.4	Impact on genetic integrity	**D**	Other published material		
2.1	Role of anthropogenic and natural disturbance	**B**	Observational	**"Invasiveness"** *For questions at left, an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Sum total of all points for Q2.1-2.7:* **11 pts** **Section 2 Score:** **B**	
2.2	Local rate of spread with no management	**B**	Observational		
2.3	Recent trend in total area infested within state	**C**	Observational		
2.4	Innate reproductive potential	**B**	Other published material		
2.5	Potential for human-caused dispersal	**B**	Other published material		
2.6	Potential for natural long-distance dispersal	**C**	Observational		
2.7	Other regions invaded	**C**	Other published material		RED FLAG **NO** Something you should know.
3.1	Ecological amplitude	**C**	Other published material	**"Distribution"** **Section 3 Score:** **C**	
3.2	Distribution	**C**	Observational		

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes *Score:* **B** *Doc'n level:* **Other pub**.
Identify ecosystem processes impacted: Light availability, erosion.
Rationale: Once established, *Vinca major* can form dense carpets. Patches of *V. major* can reach 100% cover along stream banks. Dense mats may smother all native groundcover vegetation and prevent regeneration of trees and shrubs. This can have important long term consequences on streambanks, where the eventual loss of native trees and shrub cover could lead to erosion.
Sources of information: See Bailey (1914), Bean and Russo (1988), McLaughlin (1994), and Gilbert (2003). Also considered personal field observations of E. Makings (Terrestrial Ecosystems Botanist, U.S. Department of Agriculture, Forest Service, Tonto National Forest, 2005).

Question 1.2 Impact on plant community composition, structure, and interactions *Score:* **B** *Doc'n level:* **Other pub**.
Identify type of impact or alteration: Forms patches dominated by *V. major.*
Rationale: *Vinca major* forms dense patches which exclude other plants. This creates a problem in areas where it competes with natives and reduces the level of diversity.
Sources of information: See McClintock (1985 in Bean Russo 1988) and Pilversack (1999). Also considered information from two online databases: (1) Conservation Council of the South East Region (CCSER Undated) *Vinca major.* Weeds. Australian Capital Territory Government (available online at: http://www.ecoaction.net) and (2) Eurobodalla Shire Council (ESC Undated) *Vinca major.* South Coast Weeds (available online at: http://www.esc.nsw.gov).

Question 1.3 Impact on higher trophic levels *Score:* **U** *Doc'n level:* **Other pub**.
Identify type of impact or alteration: Extirpation of existing native or endangered species and reduction in native forage site/habitat are possible, though no published evidence or observations of higher trophic level impacts were identified.
Rationale: Once established *V. major* competes with native vegetation by smothering all native groundcover vegetation and preventing the regeneration of trees and shrubs which in turn potentially reduces habitat and forage for animals utilizing the riparian corridor. *Vinca major* is able to grow in deep shade and poor soil, giving it a competitive advantage over other vegetation. Because no published evidence or observations of impacts were identified, the level of impact was determined to be unknown.
Sources of information: See Bailey (1914 in Bean and Russo 1988) and Pilversack (1999). Also considered information from the Global Invasive Species Database (ISSG Undated) *Vinca major* (available online at: http://www.issg.org/database).

Question 1.4 Impact on genetic integrity *Score:* **D** *Doc'n level:* **Other pub**.
Identify impacts: No none hybridization.
Rationale: No native *Vinca* in Arizona (Kearney and Peebles 1960)
Sources of information: See cited literature; also see Salisbury (1961 in Bean and Russo 1988) and McLaughlin (1994).

Question 2.1 Role of anthropogenic and natural disturbance in establishment *Score:* **B** *Doc'n level:* **Obs**.
Describe role of disturbance: Cultivation, floods.
Rationale: *Vinca major* is introduced to new locations usually as ornamental groundcover. This species appears to be dependent on human intervention for establishment. In Arizona it is mostly associated with historical and currently occupied homesites. *Vinca major* may be a threat to the understory of riverine vegetation as it can spread from plant fragments carried by high flows. In Arizona downstream establishment in most rivers is less likely because of the flashy nature of our rivers and flow regulation

situation (dams). Fragments may break and be carried by high flows, but would require a shady, moist microclimate to become established.
Sources of information: See Muenscher (1955 in Bean and Russo 1988). Also considered information from the Global Invasive Species Database (ISSG Undated) *Vinca major* (available online at: http://www.issg.org/database) and personal field observations of E. Makings (Terrestrial Ecosystems Botanist, U.S. Department of Agriculture, Forest Service, Tonto National Forest, 2005). Score based on inference in part.

Question 2.2 Local rate of spread with no management	*Score:* **B** *Doc'n level:* **Obs**.
Describe rate of spread: Increases, but less rapidly than doubling in <10 years.	
Rationale: By most accounts, *V. major* is spreading slowly and locally only where it has been intentionally introduced.	
Sources of information: See Pilversack (1999). Also considered information from the Conservation Council of the South East Region (CCSER Undated) *Vinca major.* Weeds. Australian Capital Territory Government (available online at: http://www.ecoaction.net), personal field observations of E. Makings (Terrestrial Ecosystems Botanist, U.S. Department of Agriculture, Forest Service, Tonto National Forest, 2005), and personal communications with E. Gilbert (observations while conducting floristic inventory of the West Fork of Oak Creek Canyon, Coconino County, Arizona as an Arizona State University graduate student, Tempe, Arizona, 2003) and M. Killeen (Assistant Manager Southeast Arizona Preserves, The Nature Conservancy, Ramsey Canyon Preserve, 2005).	

Question 2.3 Recent trend in total area infested within state	*Score:* **C** *Doc'n level:* **Obs**.
Describe trend: Species seems to be filling in through density increases at its known infestation sites.	
Rationale: Patches of *V. major* exist in riparian areas throughout the state. Rate of spread is not known from the literature. Arizona populations appear to be slowly increasing at the local level.	
Sources of information: Bean and Russo (1988). Also considered personal field observations of E. Makings (Terrestrial Ecosystems Botanist, U.S. Department of Agriculture, Forest Service, Tonto National Forest, 2005) and personal communication with M. Killeen (Assistant Manager Southeast Arizona Preserves, The Nature Conservancy, Ramsey Canyon Preserve, 2005).	

Question 2.4 Innate reproductive potential	*Score:* **B** *Doc'n level:* **Other pub**.
Describe key reproductive characteristics: *Vinca major* does not reproduce by seed in the wild (Salisbury 1961 in Bean and Russo 1988). Established plants spread by stolons rooting at the nodes and broken off sections of stem will take root.	
Rationale: See Worksheet A.	
Sources of information: See cited literature. Also considered information from the Conservation Council of the South East Region (CCSER Undated) *Vinca major.* Weeds. Australian Capital Territory Government (available online at: http://www.ecoaction.net).	

Question 2.5 Potential for human-caused dispersal	*Score:* **B** *Doc'n level:* **Other pub**.
Identify dispersal mechanisms: *Vinca major* is available commercially as an ornamental groundcover. It is cultivated in areas of the U.S. with mild temperatures where it has also spread outside of cultivation.	
Rationale: The potential for human caused dispersal is moderate to low since it requires active intervention to be introduced to a new site (i.e., planting).	
Sources of information: See McClintock (1985 in Bean and Russo 1988).	

Question 2.6 Potential for natural long-distance dispersal *Score:* **C** *Doc'n level:* **Obs**.
Identify dispersal mechanisms: *Vinca major* is a riparian species that thrives along shady stream banks in Arizona (SEINet 2005). Detached stems from *V. major* have the ability to resprout after being carried downstream.
Rationale: Opportunities for dispersal of *V. major* are limited. The potential for long distance dispersal as a result of flooding events is probably rare.
Sources of information: Considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2005) and the Conservation Council of the South East Region (CCSER Undated) *Vinca major.* Weeds. Australian Capital Territory Government (available online at: http://www.ecoaction.net).

Question 2.7 Other regions invaded *Score:* **C** *Doc'n level:* **Other pub**.
Identify other regions: Natural forests, riparian zones, disturbed sites such as campgrounds and homesteads.
Rationale: Worldwide, *V. major* occurs in a variety of habitats associated with shady, moist grounds. It commonly occurs along riverbanks, ephemeral or permanent creek margins, and around lawns, cemeteries, and drainages where dense cover is available. These ecological types do not differ from those it occupies within the state.
Sources of information: See Bean and Russo (1988) and Hickman (1993). Also considered information from the Global Invasive Species Database (ISSG Undated) *Vinca major* (available online at: http://www.issg.org/database).

Question 3.1 Ecological amplitude *Score:* **C** *Doc'n level:* **Other pub**.
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Natural and anthropogenic disturbed sites within Sonoran riparian (cottonwood-willow) and southwestern interior riparian (mixed deciduous broadleaf) ecological types.
Rationale: In Arizona *V. major* is documented along riparian corridors in the above ecological types. There are 27 vouchered collections held at the three main herbaria in Arizona (SEINet 2005). Thirteen different localities appear to be represented by those collections since many may be site duplications. For example, "West Fork of Oak Creek" or "Oak Creek Canyon" are cited in several collections but represent only two localities.
Sources of information: Information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2005).

Question 3.2 Distribution *Score:* **C** *Doc'n level:* **Obs**.
Describe distribution: See question 3.1. Occurrence frequency within the two ecological types invaded is limited.
Rationale: See Worksheet B and information in question 3.1.
Sources of information: Information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2005).

Worksheet A. Reproductive Characteristics

Complete this worksheet to answer Question 2.4.

Reaches reproductive maturity in 2 years or less	**Yes**	**No**	**1 pt.**
Dense infestations produce >1,000 viable seed per square meter	**Yes**	**No**	**2 pt.**
Populations of this species produce seeds every year.	**Yes**	**No**	**1 pt.**
Seed production sustained for 3 or more months within a population annually	**Yes**	**No**	**1 pt.**
Seeds remain viable in soil for three or more years	**Yes**	**No**	**2 pt.**
Viable seed produced with *both* self-pollination and cross-pollination	**Yes**	**No**	**1 pt.**
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	**Yes**	**No**	**1 pt.**
Fragments easily and fragments can become established elsewhere	**Yes**	**No**	**2 pt.**
Resprouts readily when cut, grazed, or burned	**Yes**	**No**	**1 pt.**

Total pts: 4 Total unknowns: 1

Score : B

Note any related traits:

Worksheet B. Arizona Ecological Types

(*sensu* Brown 1994 and Brown et al. 1998)

Major Ecological Types	Minor Ecological Types	Code*
Dunes	dunes	
Scrublands	Great Basin montane scrub	
	southwestern interior chaparral scrub	
Desertlands	Great Basin desertscrub	
	Mohave desertscrub	
	Chihuahuan desertscrub	
	Sonoran desertscrub	
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	
	semi-desert grassland	
Freshwater Systems	lakes, ponds, reservoirs	
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	**C**
	southwestern interior riparian	**C**
	montane riparian	
Woodlands	Great Basin conifer woodland	
	Madrean evergreen woodland	
Forests	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	
Tundra (alpine)	tundra (alpine)	

*A means >50% of type occurrences are invaded; B means >20% to 50%; C means >5% to 20%; D means present but ≤5%; U means unknown (unable to estimate percentage of occurrences invaded).

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